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Quality of Life of Children Ages 4-16 Years Old with Atopic Dermatitis using the Filipino Translation of Children's Dermatology Life Quality Index Questionnaire (CDLQI) *[Indeks ng Kalidad ng Buhay ng Pang-Dermatolohiya ng mga Bata (IKPaB)]*

Rhia Adrienne R. Reburiano, MD and Shirley Lam Kwong-Buizon, MD

Department of Allergy, Asthma, and Immunology Unit, Fe Del Mundo Medical Center, Quezon City, Philippines

Correspondence to:
Rhia Adrienne R. Reburiano, MD
Fe Del Mundo Medical Center
11 Banawe St., Quezon City,
Metro Manila, Philippines 1113
Tel.: (+632) 87120845
E-mail: rhiareburiano.md@gmail.com

ABSTRACT

Background: Atopic dermatitis (AD) is a chronic and relapsing skin condition known to have detrimental psychosocial impact in the pediatric population as well as a negative effect on their quality of life (QoL). This study determined the effect of AD on the QoL of patients ages 4-16 years old using the Filipino translation of Children's Dermatology Life Quality Index Questionnaire *[Indeks ng Kalidad ng Buhay ng Pang-Dermatolohiya ng mga Bata* (IKPaB)].

Methodology: This investigation used a cross-sectional analytic study design. The IKPaB was administered to 50 patients with AD diagnosed within the context of a baseline medical history, physical examination and United Kingdom Working Party's diagnostic criteria. Ten questions, covering 6 areas of daily activities (symptoms/feelings, leisure, school or holidays, personal relationships, sleep and treatment), were answered using a 4-point Likert scale score from 0 to 3. The total score yielded a minimum score of 0 and a maximum score of 30. Higher *IKPaB* score indicated a greater degree of QoL impairment. Statistical analysis was done using Z score and Mann Whitney U test.

Results: In the 6 variables measured, a small effect of AD on the symptoms and feeling and school holiday, while no effect on leisure, personal relationship, sleep and treatment were noted. No statistical variations were noted between life quality index of children when patients were grouped according to age, sex, body mass index, co-morbid conditions, parental education, employment, residence and family history of AD. Compounding all variables, mean ± SD score of 10.48 ± 5.05 showed a moderate effect on QoL.

Conclusions: AD of patients ages 4-16 years old had moderate effect on QoL as predicted by the *IKPaB*.

Keywords: atopic dermatitis, quality of life, Children's Dermatology Life Quality Index, *Indeks ng Kalidad ng Buhay ng Pang-Dermatolohiya ng mga Bata*

INTRODUCTION

Atopic dermatitis (AD) is a chronic recurrent and relapsing inflammatory skin condition in the pediatric population.[1] It is of multifactorial etiology, primarily characterized by moderate-to-intense pruritus. In the developing and industrialized countries worldwide, the increasing prevalence of AD has slowly become a major public health problem in the past 3 decades.[2] As it is known, the prevalence rate of AD is rising, now affecting 15-30% of children and 2-10% of adults. In Western industrialized countries, when stratified according to age, AD affects approximately 20% of all children at age 6 years and 5% of adults. In a study done covering the three main regions of the Philippines urban areas, the prevalence of AD among children <12 years of age was 19.89%.[3] Although exact pathogenesis of AD still remains trivial, it is well established that AD is a combination of genetic and environmental factors. In patients with AD, a genetically determined alteration of the skin barrier allows penetration of various environmental factors which are linked to a local and systemic immune dysregulation.[1,2]

AD may not cause as much mortality as the well-known cancer or other life-threatening diseases but the stigma and impaired quality of life it brings to an affected individual may be as equally bothersome and alarming.[4] Despite the fact that AD is said to be the most common pediatric dermatological condition in the world, with correct management, it is also one of the most treatable disease entities. The chronicity and inconvenience of AD management significantly influences the patients' quality of life (QoL). AD often affects the youngest patients and therefore has an impact on the QoL of parents and caregivers as well.[5]

An assessment of well-being or lack of thereof in an individual's daily life is perceived as quality of life. Collectively, this concept includes family life, community and standard of living. Patients suffering from skin diseases experience an extensive symptomatology such as a simple localized itch to causing a major disability eventually affecting their daily lives. The distress of living with AD cannot be overemphasized for it may become detrimental on the health-related quality of life (HRQoL) of children and their families. The effects of AD on young children and their families have been investigated both qualitatively and quantitatively. AD has been documented to affect the physical health, emotional health, physical functioning, and social functioning of the child and their parents. Several QoL instruments have been developed to quantify this multidimensional impact on children and their families.[6–9] Accurate measurement of the burden of AD with QoL instruments can be used to improve the lives of afflicted children and their families.[10] The questionnaire utilized in this study - Filipino translation of Children's Dermatology Life Quality Index *[Indeks ng Kalidad ng Buhay ng Pang-Dermatolohiya ng mga Bata (IKPaB)]* has been linguistically translated and validated in the Philippines last 2014.

METHODOLOGY

Research Design
This investigation used a cross-sectional analytic study design.

Duration of the Study
This research was completed from June – September 2019.

Study Setting and Population
This study was conducted in an outpatient clinic of a tertiary hospital in Quezon City, Manila, Philippines.

Criteria for Inclusion
All children ages 4-16 years diagnosed with AD according to the United Kingdom Working Party's diagnostic criteria for atopic dermatitis, seen at the outpatient department of the participating institution, and whose parents or caregivers gave consent to participate in the study.

Exclusion Criteria
1. Children who have other skin lesions not attributable to AD.
2. Patients who suffer from diseases that may affect judgment.
3. Patients with AD but are critically ill upon consult.

Questionnaire
This study utilized the Filipino translation of Children's Dermatology Life Quality Index *[Indeks ng Kalidad ng Buhay ng Pang-Dermatolohiya ng mga Bata (IKPaB)]* to children ages 4-16 years old seen at an outpatient clinic of a tertiary hospital. It is self-explanatory and may be completed by the child alone, with help given by the parents or guardian as necessary. In the Philippines, the *IKPaB*, a Filipino translation of the CDLQI text version was validated last 2014. Ten questions constitute the *IKPaB*: 1 and 2, asks about symptoms and feelings of children with the skin condition; 4 to 6 are inquiries about the effects of the skin condition on leisure; 7, addresses conflicts in school or holidays; 9, probes questions about sleep disturbances brought about by the skin disease; and 10, is about the treatment challenges encountered by the patient. Four graded responses; each with assigned weighted score from 0 to 3, excluding 7.1 (regarding schoolwork), for which a 5th possible response is applicable (5 = *di nakakapasok sa eskwela*).[11] Each question is answered on a 4-point Likert scale scored from 0 to 3. The scoring for each question is "very much" or "*sobra sobra*" [score = 3], "quite a lot" or "*masyado*" [2], "only a little" or "*kaunti lang*"

[1], "not at all" or "*hindi kailan man*" [0], "blank" [0], and Q7 – "prevented school" or "*di nakakapasok sa eskwela*" [3]. The 10 individual question scores are summed to provide total CDLQI score; it may give a minimum score of 0 and the maximum possible score is 30, indicating maximum impact on QoL. The following severity bands for CDLQI scores were subsequently created and are used in the interpretation of QoL in this paper: 0-1, no effect on QoL; 2-6, small effect; 7-12, moderate effect; 13-18, very large effect; 19-30, extremely large effect. A higher CDLQI score indicates greater degree of QoL impairment.[12]

Data Collection

1. Patients, who were either previously or newly diagnosed with AD by an allergist or dermatologist according to the United Kingdom Working Party's diagnostic criteria, were recruited from the outpatient clinic of a tertiary hospital.
2. The primary investigator explained the study's objectives, risks and benefits to participants and their primary caregivers. Participants were given ample time to read and understand the consent and assent forms. Once ensured that they understood the procedure and the study, they were asked to sign the consent and assent forms. **(**Filipino or English version depending on the preference of the patient/ caregiver). In addition to the informed consent signed by the patients parents, participants aged 10-16 were also asked to sign an assent form. Verbal assent was obtained for participants aged 10 and below.
3. *IKPaB* was then distributed and completed by the patients themselves. Patients too young and unable to read or understand the questions were guided and assisted by their parents or primary caregivers in comprehending the given questions and carefully choosing the appropriate response.
4. The following data were obtained:
    a. Patient's Data
        i. Age;
        ii. Sex;
        iii. Body Mass Index (BMI);
        iv. Comorbid Conditions (food allergy, bronchial asthma, allergic rhinitis, food allergy and bronchial asthma, food allergy and allergic rhinitis, allergic rhinitis and bronchial asthma, all three comorbidities were present — food allergy, bronchial asthma and allergic rhinitis);
    b. Parental Educational Attainment;
    c. Parental Employment;
    d. Residence; and
    e. Family history of atopy
5. After completing the questionnaire, patients were adequately advised of the treatment plan, such as allergen elimination/ avoidance, antihistamine, topical steroids, and moisturizers/emollients.

Statistical Analysis

Frequency distribution and percentage were used to determine the clinico-demographic profile of the participants. This includes age, sex, BMI, associated comorbidities, parental education and employment, residence, and family history of atopy.

Z-score was used to determine the quality of life of participants, in terms of symptoms and feelings, leisure, school or holidays, personal relationships, sleep and treatment.

Mann Whitney U Test was used to determine the significant difference between the overall quality of life and clinico-demographic profile of participants, when grouped according to age, sex, BMI, associated comorbidities, parental education, and employment, residence, and history of atopy.

RESULTS

Table 1 presents the clinico-demographic profile of Filipino children ages 4 to 16 years old diagnosed with AD. In the sample comprising 50 patients (N = 50), 72% (n = 36) were female, and 28% were male (n = 14). According to age groups, 46% (n = 23) of patients belong to the 6 to 11-year-old age group, 40% (n = 20) from the 12-16-year-old age group and 14% (n = 7) from the 4-5 years old group. Majority of participants (n = 22) had normal BMI, 20% (n = 10) were underweight, 26% (n = 13) were classified as overweight, while 10% (n = 5) were obese. A portion of our participants were shown to have associated comorbid conditions such as allergic rhinitis comprising 50% (n = 25). 18% (n = 9) presented with bronchial asthma and 6% (n = 3) presented with food allergy alone. Fourteen percent of the population (n = 7) had both allergic rhinitis and bronchial asthma, while 12% (n = 6) have both food allergy and asthma. None of the participants have both allergic rhinitis and asthma, or all three comorbidities (food allergy, asthma and allergic rhinitis). Parental educational attainment was also classified in this study. Seventy six percent (n = 38) of the subjects' parents were college graduates, while 24% (n = 12) pursued post-graduate courses such as a masteral degree, medicine, and law. Aside from parental educational attainment, effect of parental employment was investigated in this study. Forty six percent (n = 23) of parents were employed, 38% (n = 19) were self-employed, and 16% (n = 8) were unemployed. Seventy eight percent (n = 39) of participants, live Metro Manila, while 22% (n = 11) live in nearby provinces namely, Bulacan, Pangasinan and Laguna. Lastly, family history of atopy were found in 70% (n = 35) of patients, while 30% (n = 15) claimed otherwise in both maternal and paternal side.

Table 2 shows the effect of AD on the 6 variables comprising the *IKPaB*. There is a small effect on the symptoms and feeling of children (2.48 ± 1.40) and school or holiday (2.32

Table 1. Clinico-Demographic Profile of Filipino Children 4 to 16 years old with Atopic Dermatitis

Variable	n	%
Age (years)		
4-5	7	14.0
6-11	23	46.0
12-16	20	40.0
Sex		
Male	14	28.0
Female	36	72.0
Body Mass Index		
Underweight	10	20.0
Normal	22	44.0
Overweight	13	26.0
Obese	5	10.0
Comorbidities		
Food Allergy	3	6.0
Asthma	9	18.0
Allergic Rhinitis	25	50.0
Allergic Rhinitis + Asthma	0	0
Food Allergy + Asthma	6	12.0
Food Allergy + Allergic Rhinitis	7	14.0
Food Allergy + Asthma + Allergic Rhinitis	0	0
Parental Education		
College	38	76.0
Post Graduate	12	24.0
Parental Employment		
Unemployed	8	16.0
Employed	23	46.0
Self Employed	19	38.0
Residence		
Metro Manila	39	78.0
Outside Metro Manila	11	22.0
Family History of Atopy		
Yes	35	70.0
No	15	30.0

Table 2. Filipino Translation of Children's Dermatology Life Quality Index *[Indeks ng Kalidad ng Buhay ng Pang-Dermatolohiya ng mga Bata (IKPaB)]*

Variable	Mean ± SD	Score Interpretation
Symptoms and Feeling	2.48 ± 1.40	Small Effect
Leisure	0.720 ± 0.833	No Effect
School or Holiday	2.32 ± 0.683	Small Effect
Personal Relationship	0.960 ± 1.177	No Effect
Sleep	1.24 ± 0.879	No Effect
Treatment	0.740 ± 0.632	No Effect
Overall CDLQI Score	10.48 ± 5.05	Moderate Effect

Scoring performed for IKPaB was based on the instructions provided by the authors of this research questionnaire. The series of ten questions in this research instrument cover specific areas such as symptoms and feelings, leisure, school holiday, personal relationship, sleep and treatment. The overall CDLQI was computed by adding all the scores and using the interpretation of scores provided by the proponents of this standardized research instrument.

± 0.683). In contrast, AD had no effect on leisure (0.720 ± 0.833), personal relationship (0.960 ± 1.177), sleep (1.24 ± 0.879) and treatment (0.740 ± 0.632). As a whole, the *IKPaB* score of children with AD showed a moderate effect on their quality of life (10.48 ± 5.05).

The over-all QoL measured using the *IKPaB* of children with AD in terms of age, sex, BMI and comorbidities are represented in Table 3. It does not significantly vary across age group (p 0.733 > 0.05). Highest over-all mean rating was seen from children ages 12 to 16 years old (11.30 ± 5.05) followed by 6 to 11 years old (10.00 ± 4.40) and 4 to 5 years old (9.71 ± 5.64). Despite the difference in over-all mean rating of ages 12 to 16 years and 6 to 11 years, all considered AD to have moderate effect on their quality of life. Results showed no significant difference between sex and over-all *IKPaB* of participants ((p value 0.36). Although gender distribution showed females to have higher score for *IKPaB* over male subjects (10.86 ± 4.78 vs. 9.50 ± 5.77), there was no significant difference between sex and over-all *IKPaB* of children with AD (p value 0.36). Children, both male and female, consider AD to have moderate effects on their overall quality of life. BMI when compared across all subject categories showed that those who were classified as underweight have the highest mean rating (12.30 ± 5.05) followed by normal weight (10.68 ± 4.90), overweight (9.38 ± 4.90) and lastly, obese patients (8.80 ± 6.53). Regardless of the varying mean scores of patients grouped according to BMI, AD was considered to have moderate effects on their life quality index (p value 0.48). Presence of bronchial asthma in patients with AD showed a very large effect of AD in their quality of life (12.77 ± 4.91). Those with other comorbidities such as food allergy alone (11.66 ± 6.42), allergic rhinitis alone (9.88 ± 5.08), both food allergy and asthma (9.50 ± 6.50) and combined food allergy and allergic rhinitis (10.00 ± 3.60) showed moderate effects on QOL. Although there seems to be varying mean score results, it was found that the over-all CDLQI was not statistically significant when compared to the comorbid conditions of these children (p value 0.62).

Shown in Table 4 is the over-all QoL using *IKPaB* of children with AD when parental education, parental employment, residence and family history of AD were considered. It showed that participants with parents who pursued post-graduate courses (10.75 ± 5.70) and finished college (10.39 ± 4.91) shared a similar view regarding the moderate effect of AD on their over-all life quality index. Interestingly, there were no significant variations noted between these patients (p value 0.95). Parental employment did not show any significant difference between the over-all life quality index of pediatric patients with AD (p value 0.84). Subjects with self-employed parents (11.00 ± 5.57) had the highest mean score followed by those with

Table 3. Filipino Translation of Children's Dermatology Life Quality Index *[Indeks ng Kalidad ng Buhay ng Pang-Dermatolohiya ng mga Bata (IKPaB)]* Variables

Variable	Mean ± SD	Interpretation	*p*[b]
Age (years)			0.733[c]
4-5	9.71 ± 5.64	Moderate Effect	
6-11	10.00 ± 4.40	Moderate Effect	
12-16	11.30 ± 5.05	Moderate Effect	
Sex			0.363[d]
Male	9.50 ± 5.77	Moderate Effect	
Female	10.86 ± 4.78	Moderate Effect	
Body Mass Index			0.485[c]
Underweight	12.30 ± 5.05	Moderate Effect	
Normal	10.68 ± 4.90	Moderate Effect	
Overweight	9.38 ± 4.90	Moderate Effect	
Obese	8.80 ± 6.53	Moderate Effect	
Comorbid Conditions			0.620[c]
Food Allergy	11.66 ± 6.42	Moderate Effect	
Asthma	12.77 ± 4.91	Very Large Effect	
Allergic Rhinitis	9.88 ± 5.08	Moderate Effect	
Food Allergy + Asthma	9.50 ± 6.50	Moderate Effect	
Food Allergy + Allergic Rhinitis	10.00 ± 3.60	Moderate Effect	

[a] *Scoring performed for IKPaB was based on the instructions provided by the authors of this research questionnaire. The series of ten questions in this research instrument cover specific areas such as symptoms and feelings, leisure, school holiday, personal relationship, sleep and treatment. The overall CDLQI was computed by adding all the scores and using the interpretation of scores provided by the proponents of this standardized research instrument.*

[b] *Statistical significance is set at p ≤0.05 with 95% confidence interval;*

[c] *Kruskall Wallis Test*

[d] *Mann Whitney U test*

Table 4. Filipino Translation of Children's Dermatology Life Quality Index *[Indeks ng Kalidad ng Buhay ng Pang-Dermatolohiya ng mga Bata (IKPaB)]* Variables

Variable	Mean ± SD	Interpretation	*p*[b]
Parental Education			0.955[d]
College	10.39 ± 4.91	Moderate Effect	
Post Graduate	10.75 ± 5.70	Moderate Effect	
Parental Employment			0.843[c]
Unemployed	10.62 ± 6.50	Moderate Effect	
Employed	10.00 ± 4.19	Moderate Effect	
Self Employed	11.00 ± 5.57	Moderate Effect	
Residence			0.742[d]
Metro Manila	10.69 ± 5.30	Moderate Effect	
Outside Metro Manila	9.72 ± 4.19	Moderate Effect	
Family History of Atopic Dermatitis			0.464[d]
Yes	10.14 ± 5.04	Moderate Effect	
No	11.26 ± 5.17	Moderate Effect	

[a] *Scoring performed for IKPaB was based on the instructions provided by the authors of this research questionnaire. The series of ten questions in this research instrument cover specific areas such as symptoms and feelings, leisure, school holiday, personal relationship, sleep and treatment. The overall CDLQI was computed by adding all the scores and using the interpretation of scores provided by the proponents of this standardized research instrument.*

[b] *Statistical significance is set at p ≤0.05 with 95% confidence interval*

[c] *Kruskall Wallis Test*

[d] *Mann Whitney U test*

unemployed parents (10.62 ± 6.50). The least mean score was noted among subjects with employed parents (10.00 ± 4.19). Results concerning place of residence did not yield statistically significant results (p value 0.74). Participants residing in Metro Manila showed a higher mean rating score compared to those living in nearby provinces such as Bulacan, Pangasinan and Laguna (10.69 ± 5.30 vs. 9.72 ± 4.19). This indicates that children, even when stratified based on their current residence, considered having AD to have a moderate effect on their life quality index. Lastly, patients with no family history of atopy had a high mean score of over-all life quality index compared to those with family history of AD (11.26 ± 5.17 vs. 10.14 ± 5.04). There were no statistical variations noted (p value 0.46). All of these children perceived AD as having moderate effect only on their over-all life quality index.

DISCUSSION

Atopic dermatitis is considered as one of the most chronic conditions affecting all ages with increasing prevalence in Asia and an estimated global prevalence of nearly 230 million.[13] According to the International Study of Asthma and Allergies in Childhood (ISAAC) Phase 3, AD prevalence in 13- to 14-year-old adolescents in Asian-Pacific countries including the Philippines, Eastern Mediterranean region, and the Indian subcontinent were at 3-6%, while an incidence of 12-14% and 6-10% were noted for Africa and Latin America respectively. Among 6- to 7-year-old children, the incidence of AD for Asian-Pacific countries, Africa and Latin America was high at approximately 10% compared to 3-5% for Eastern Mediterranean region and Indian subcontinent.[14] In a multicenter study done in the Philippines by the Philippine Dermatological Society from 2007-2011, AD was noted to have a prevalence of 0.57%. More than half of the patients (65.1%) were children between 1 to 12 years old, 24% were infants less than one year of age and the average age was seven years old.[15] In an ISAAC survey done in the Philippines, prevalence of any history of AD in children aged 13–14 years ranged 7.1–8.4%. In another study done in 2007-2011 among 14,363 dermatology patients in outpatient clinics, only 3.4% of the cases were diagnosed with AD. Of the survey participants, 89% were newly diagnosed and only 11% were previously diagnosed.[16]

Globally, AD is known to have a negative impact on the quality of life of the affected children and similarly, burden their families. Sleep, work productivity, mental and emotional health, physical activity and social functioning is affected.[17] Itch and pain eventually lead to mood changes, social isolation and the increasing incidence of depression.[18,19]

The burden dermatologic diseases such as AD, when compared with other life-threatening diseases, are frequently underestimated and considered of low importance because of its non-fatal nature. Clinicians focus of therapy is on improving the skin condition alone and often, the patients' psychological needs and quality of life is overlooked. Patient's quality of life is closely related to AD because of the disfiguring and irritating nature of the disease. As per the Global Burden Disease Study, skin diseases were recently established to be the fourth most burdensome non-fatal disease.[20]

AD has a substantial social and economic effect on the direct cost of treatment, and equally on the indirect costs such as unemployment and decline in productivity and most importantly, deterioration of the quality of life.[21-23] Despite a plateau at 10–20% in many developed countries, the incidence continues to rise in many developing countries.[24] This investigation was conducted to determine the influence of AD on the quality of life of pediatric patients aged 4-16 years, seen at the outpatient clinic of a tertiary hospital using the Filipino translation of Children's Dermatology Life Quality Index *[Indeks ng Kalidad ng Buhay Pang-dermatolohiya ng mga Bata (IKPaB)]*.

When stratified by gender, this investigation showed that females are affected more than males. This may be because females generally account for majority of patients diagnosed with AD.[25] With regard to the distribution of population, children ages 12 to 16 years old were mostly affected by AD.[13]

From 2% to 3% before 1960, to 9-12% after 1970, the prevalence of AD in childhood is continuously rising to as high as 20% at present. Similarly, between 1976-1980 and 2007-2008, the rate of obesity has increased by more than double in children and adolescents. Preferential activation and trafficking of leukocyte subsets and proinflammatory immune responses are know effects of obesity on the immune system. This, in turn may modulate the severity of atopic disorders, such as AD or asthma. Obesity, asthma as well as wheezing, in children and adolescents are associated in numerous studies. An investigation done by Silverberg et al., demonstrated a correlation of obesity in children and an increased incidence of AD (conditional logistic regression: odds ratio, 2.00; 95% CI, 1.22-3.26; $P = 0.006$). When obesity was documented at age less than 2 years, the atopic dermatitis-predisposing effects are recognized (adjusted odds ratio [aOR], 15.10; 95% CI, 1.51-151.21; $P = 0.02$) and between 2 to 5 years (aOR, 2.58; 95% CI, 1.24-5.41; $P = 0.01$) but not exceeding 5 years (aOR, 1.32; 95% CI, 0.66-2.64; $P = 0.43$) and when obesity was extended for 2.5 to 5 years (aOR, 2.64; 95% CI, 1.13-6.18; $P = 0.03$) and after 5 years (aOR, 3.40; 95% CI, 1.34-8.63; $P = 0.01$). Obesity was related to more severe AD (ordinal logistic regression: aOR, 2.37; 95% CI, 1.24-5.37; $P = 0.01$). Eventually, children with obesity and AD require frequent pediatrician visits for the management of AD (ordinal logistic regression: aOR, 2.22; 95% CI, 1.12-4.50; $P = 0.03$). Contrary to the previously stated finding, a study in 2011 by Larbi et al. found out that high BMI was not, in any way, associated with atopy; instead, an inverse association was observed between underweight and atopy [OR: 0.57, 95% CI: 0.33-0.99] in school aged children living in Ghana. Our study showed moderate effect of AD across all 4 categories of BMI included. A recent study was presented in 2017 by Dr. Nagarajan at the American Academy of Allergy, Asthma and Immunology, which reviewed medical charts of children aged 0-21 years of age with history of allergic rhinitis, AD, asthma and food allergies. In this study, the mean age of patients was 9 years old, 23% were obese, and 55% were male. No differences in the prevalence of individual/or cumulative atopic disease in obese children and laboratory biomarkers were observed when compared with controls. When stratified by gender, a significantly higher mean atopic disease score was observed in obese females compared with controls (4.00 vs. 2.62, respectively; $P < 0.001$) whereas a significantly lower mean atopic disease score in males were seen compared to controls (3 vs. 3.42; $P < 0.001$). Similar results were provided by regression models; higher mean atopic disease score for obese females compared with controls (by a mean elevation of 1.37 points; $P < 0.005$) alternatively males had a significantly lower mean atopic disease score (by a mean decline of -0.42 points; $P < 0.006$). With this in mind, female gender was determined to be a positive risk factor for atopy especially obese females from urban areas, who will likely gain from lifestyle change like diet modification and exercise for weight control. A moderate effect of BMI on AD across all population was concluded in this investigation.

The 4 major presentation of atopic diseases are allergic rhinitis, asthma, food allergy and AD are constantly increasing. One precedes the others, or in majority of cases, they appear combined. Occurrence and effects of these diseases were correlated in this study.

AD is known to be the "entry point" ensuing other allergic diseases hence an effective management of AD could halt the development of respiratory allergy and to mitigate the severity of asthma and allergic rhinitis.[26] One of the known risk factors of asthma is the diagnosis of AD at an early age.

In a study done by Sofranac et al., in 2008, 99.3% of children with allergic rhinitis had coexisting asthma while 30.3% of children with allergic rhinitis also had AD. The degree of correlation between allergic rhinitis and asthma was higher than that between allergic rhinitis and AD.

AD and food allergy are intertwined. Food allergies are on the rise worldwide, known to significantly impact children. Estimated prevalence in childhood in the developed world of 3-10%. As it is known, both AD and food allergies are common conditions in childhood. Children with AD are at a higher risk of food allergies (FA), with up to a third of children with moderate to severe AD experiencing IgE-mediated food allergies.[27] Presence of early life food sensitization and allergy predicts severe AD with poorer prognosis.

This study showed a moderate impact of children's AD on parent's employment using the *IKPaB*. Employee productivity likewise is affected by absenteeism and eventually affecting parental employment. This research showed moderate effects of AD in parents' absenteeism.

Participants of this study from rural areas of Metro Manila and Laguna, Pangasinan and Bulacan expressed moderate effect of AD in their lives. An interplay between environmental exposures, genetics, individual use of personal care products, exposure to varying climates, pollution, food and other exogenous factors may trigger AD in predisposed individuals causing an increase in global prevalence. Contrary to the results of this investigation, numerous studies claimed that AD prevalence is higher in urban compared to rural or suburban areas. In a systematic review performed by Schram et al., in 2010, found evidence for an urban-rural discrepancy in AD prevalence. AD in urban areas posed a higher risk in 11 of the 26 studies, 1 showed a significantly lower risk and 14 showed no significant association. Increased stress, greater proximity to automobile traffic and related pollutants, higher exposure to other pollutants, fewer protective exposures such as manure and farm-animals and other lifestyle and cultural factors that might impact skincare may be associated with AD and urban living.[28]

Seventy percent of the investigation's participants claimed to have a family history of atopy. This is supported by other literature, stating that pediatric patients with history of atopy among family members, especially first degree relatives, had an increased risk of developing AD. It has been established that atopic diseases are inherited.[29] The risk of early onset atopic symptoms during the first 2 decades of life is strongly dependent on the atopic manifestation of their parents and siblings. At the phenotypic level, there is a strong association between specific allergy symptoms in the child and the similar manifestation in parents or siblings than with other atopic symptoms in the family suggesting the presence of phenotype-specific genes. A comparison between the influence of maternal versus paternal phenotype on the development of atopic disease in children depicted a stronger influence of maternal phenotype.

This investigation showed that AD had moderate effect on patients' life quality index. Among the facets of this questionnaire, AD showed small effect in terms of symptoms and feelings and school holidays. Similarly, in a study done by Halvorsen et.al, it was found that AD had minimally affected social aspects in school. Patients experienced embarrassment and sadness due to their condition.[18] Moreover, school work was shown to be affected by AD and it has negatively affected enjoying holidays, as well. This was congruent with studies showing patients with AD had experienced problems during school and vacations.[26]

No statistical differences were noted among the participants' clinico-demographic profiles. Participants' age, sex, BMI, and other related variables did not show any variation in relation to their quality of life. The results show that patients included in the study shared similar perceptions on the effect of AD on different aspects of their lives. Other studies likewise found that patients with AD, regardless of their baseline data such as age and gender, share a similar quality of life. These patients considered AD to affect their relationships, their school and academic life, etc.[30-32]

Because AD may be considered as the starting point for the development of subsequent allergic diseases, it is essential that clinicians include assessment for other atopic diseases, such as asthma, allergic rhinits, and food allergy, in AD management.

The investigation disclosed significant information regarding the life quality index of patients with AD, where they consider it to moderately affect their lives. In this regard, it is of utmost importance that AD be mindfully managed so as not to compromise their over-all outlook in life. Counselling, more so, other psychological services should be provided to patients with AD since these patients commonly encounter problems in school brought about by their condition. AD should be treated promptly as this may cause possible complications such as opportunistic infections among others. These could potentially affect the quality of life of these patients further.

CONCLUSION

In this study done at an outpatient clinic, subjects were made up mostly of females diagnosed with AD. BMI of most patients were normal. Comorbidities most commonly associated with AD were allergic rhinitis and bronchial asthma. Parents of participants were mostly college graduates and currently employed. Most of the subjects reside in Metro Manila and claimed to have family history of atopy.

As a whole, patients with AD claimed to experience moderate effects on their life quality index. However,

symptoms and feelings and school holidays was noted to have a small effect. Furthermore, leisure and sleeping activities had no effect.

There were no differences noted between life quality index of children when patients were grouped according to age, sex, BMI, comorbid conditions, parental education, employment, residence and family history of AD.

Recommendations

Based on the conclusions drawn from the results of the study, the following recommendations are forwarded:

1. Prospective evaluation of the life quality of index of pediatric patients with AD after treatment and management may be considered as a research topic in the future.
2. Through the results of this questionnaire, there is a heightened interest in the identification of environmental risks as well as protective factors for AD.
3. Another *IKPaB* questionnaire to be answered on follow-up will give a quick assessment of how effective was the intervention for the patient.
4. Having been equipped with proper knowledge and effects on quality of life of this disease, primary and secondary prevention of AD should be emphasized.

Limitations of the Study

There are a number of limitations of this study that should be considered as a caveat:

1. The sample size (N = 50) and population chosen for this study was limited to AD patients seen at the outpatient department of the institution. The results obtained from this study may not be applicable to other diagnosed cases of AD because the sample was restricted.
2. Due to the limited duration covered by this study, the results will not be representative of the wholistic QoL of AD patients which would have been serially determined using the *IKPaB* on successive follow-ups.
3. In order to qualify as a case of AD and be included as subject in this study, the U.K. Working Party's Diagnostic Criteria was used. These criteria include an itchy skin condition plus three or more of the following: history of flexural involvement, a history of asthma/hay fever, a history of a generalized dry skin, onset of rash under the age of 2 years, or visible flexural dermatitis. Finally, this research only assessed the effect of AD in diagnosed cases without qualifying the severity in each subject. It is possible that AD effects in QoL may not the same across varying severity.

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Statement of Authorship

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Author Disclosure

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